REMARKS

Claims 1-6, 8-11, 13-26, and 28-30 are currently pending in the instant application. Claim 7 has been cancelled and thus is no longer pending. Claims 1-6, 8-11, 13-26, and 28-30 have been amended herein. It is submitted that the amendments set forth herein do not enter new matter. A complete listing of claims is presented on pages 2-6 of this document.

Assignee's representative thanks Examiners Luong and Chen for the courtesies extended during the telephonic interview conducted on February 7, 2011, during which amended independent claims were discussed in view of the cited art. Agreement was reached that proposed amendments overcome current rejection of claims under 35 U.S.C. §103(a). No agreement was reached on allowable subject matter.

A Declaration under 37 C.F.R. 1.132 traversing the rejection set forth in the subject Office action is submitted in conjunction with this paper.

Favorable reconsideration is respectfully requested in view of the following remarks and amendments herein.

I. Rejection of Claims 1-11, 13-26, and 28-30 under 35 U.S.C. §103(a)

Claims 1-11, 13-26, and 28-30 stand rejected under 35 U.S.C. §103(a) over "Combined Ultrasound and Fluorescence Spectroscopy for Physico-Chemical Imaging of Atherosclerosis," IEEE Transactions on Biomedical Engineering 42(2) (1995): 121-132, by Warren et al. in view of Tomography – Definition from Dictionary.com and McCarthy (US 2003/0087244). This rejection of claim 7 is now moot in view of cancellation thereof. Assignee's representative respectfully requests the rejection of the subject claims be reconsidered and withdrawn for at least the following reasons.

The Examiner has the burden of establishing a prima facie case of obviousness under 35 U.S.C. § 103(a). Ex *Parte Martin P. Hageman and Thomas J. Palus*, Appeal No. 2000-1514, Application No. 09/038,450 (citing *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)); *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984). Only if the Examiner satisfies this initial burden does the burden of coming forward with evidence shift to the Appellant. *Id.* The Examiner can satisfy this burden by showing some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the

claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

A prima facie case of obviousness requires: (1) a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings; (2) a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re Fine*, 87 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); MPEP § 2142, 8th Ed., Rev. 4. Furthermore, rejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be explicit analysis including some rational underpinning to support the legal conclusion of obviousness. *K.S.R. International Co. v. Teleflex, Inc.*, et al., 550 U.S. 14 (April 2007), citing *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006).

Claims 1-6, 8-11, and 13-15.—Independent claim 1 (from which claims 2-6, 8-11, and 13-15 depend) recites, in part:

reconstructing a bioluminescent source distribution of the object *based at least on the mapped optical properties, wherein* ***the reconstructing comprises producing an imaging matrix of coefficients dependent of the mapped optical properties and an anatomical structure of the object by solving a radiative transfer equation or an approximation to the radiative transfer equation via at least one of a finite-element method, a mesh-free method, or a Monte Carlo simulation***.

The cited art fails to disclose or suggest such novel feature.

Warren et al. generally discloses (Abstract) "[t]his paper describes a combined ultrasonic and spectroscopic system for remotely obtaining physico-chemical images of normal arterial tissue and atherosclerotic plaque." Warren et al. fails to disclose or suggest a method and system for reconstructing a bioluminescent source distribution within an object as Warren et al. discloses only determining the chemical composition of a sample by "fitting its fluorescence spectrum (in calibrated units) to a model of tissue fluorescence incorporating protein and hemoglobin

attenuation" and compensating for distance variation (Abstract; Warren et al.). In addition, Warren et al. discloses only fluorescence and fails to disclose or suggest bioluminescence.

The subject Office action contends that Warren et al. discloses producing "a bioluminescent source distribution (page 126, col. 1, lines 54-58; page 123 Monte Carlo radiative transfer model), based on the mapped optical properties (page 126, col. 1, lines 54-58)." (See Office Action, pg. 3.) Applicant respectfully traverses this assertion. Page 126, col. 1, lines 54-58 of Warren et al. discloses:

> Finally, a combined fluorescence/ultrasound image of a section of aorta containing normal and atherosclerotic tissue was produced with the system by obtaining **fluorescence spectra** and ultrasound reflection times at a series of adjacent pixels along the intimal surface." (Emphasis added.)

Moreover, at page 123, section "C. Monte Carlo Fluorescence Model", Warren et al. discloses:

> Although developing an analytical model to describe changes in **detected tissue fluorescence** with detector-sample separation is complicated, **Monte Carlo techniques [19] were used to simulate photon propagation in scattering tissues** in order to validate the form of the empirical model of (4). Weighted photons **at the excitation wavelength** were injected into the front surface of a sample at normal incidence and propagated according to the method presented in [21] until they were absorbed, remitted from the sample front surface, or transmitted through the sample sides or back surface. **Upon partial absorption of each weighted excitation photon, a fluorescence photon was generated** whose weight was equal to the absorbed weight at the excitation wavelength. Each weighted fluorescence photon was propagated until it was absorbed, remitted, or transmitted[...]. (Emphasis added.)

Thus, it is readily apparent that Monte Carlo techniques as employed in Warren et al. are related to modeling fluorescence rather than to ***producing an imaging matrix of coefficients dependent of the mapped optical properties by solving a radiative transfer equation or an approximation to the radiative transfer equation via at least one of a finite-element method, a mesh-free method, or a Monte Carlo simulation***. As understood by a person of ordinary skill in the art, fluorescence differs significantly from bioluminescence and cannot be used interchangeably. Thus, it is submitted that one of ordinary skill in the art would not modify Warren et al. to arrive

at claim 1 as a whole. Therefore, it is submitted that Warren et al. fails to teach or suggest the above-referenced feature recited in claim 1.

Tomography – Definition from Dictionary.com and McCarthy likewise fails to disclose or suggest the claimed aspect of ***reconstructing a bioluminescent source distribution of the object*** *based at least on the mapped optical properties, wherein* ***the reconstructing comprises producing an imaging matrix of coefficients dependent of the mapped optical properties by solving a radiative transfer equation or an approximation to the radiative transfer equation via at least one of a finite-element method, a mesh-free method, or a Monte Carlo simulation***. It is noted that McCarthy is cited in the subject Office primarily for disclosure therein of bioluminescent labels and related aspects; namely (¶[0188]; McCarthy):

> The antibody also can be detectably labeled by coupling it to a chemiluminescent compound. The presence of the chemiluminescent-tagged antibody is then determined by detecting the presence of luminescence that arises during the course of a chemical reaction. Examples of particularly useful chemiluminescent labeling compounds are luminol, isoluminol, theromatic acridinium ester, imidazole, acridinium salt and oxalate ester. Likewise, a-bioluminescent compound may-be used to label-the antibody of the present invention. Bioluminescence is a type of chemiluminescence found in biological systems in, which a catalytic protein increases the efficiency of the chemiluminescent reaction. The presence of a bioluminescent protein is determined by detecting the presence of luminescence. Important bioluminescent compounds for purposes of labeling are luciferin, luciferase and aequorin.

Therefore, based at least on the preceding discussion, the cited art, individually or in combination, fails to disclose or suggest independent claim 1 as a whole.

Claims 16-26 and 28-30.—Independent claim 16 (from which claims 17-26 and 28-30 depend) recites, in part:

reconstructing a bioluminescent source distribution of the object based at least on the mapped optical properties*, wherein the bioluminescent source distribution is produced using a radiative transfer equation or an approximation to the radiative transfer equation.*

For at least the reasons discussed hereinbefore and in view of the Declaration under 37 C.F.R. §1.132 that is enclosed herewith, it is submitted that the cited art fails to disclose or suggest such novel aspects.

In view of at least the foregoing, assignee's representative respectfully submits that independent Claims 1 and 16 are patentable over Warren et al. in view of Tomography – Definition from Dictionary.com and McCarthy. Assignee's representative, therefore, respectfully requests that the rejection of claims 1-11, 13-26, and 28-30 be withdrawn and the subject claims be allowed.

II. Conclusion

In view of the foregoing comments and amendments herein, Assignee's representative respectfully asserts that all pending claims are in condition for allowance and requests removal of the outstanding rejections.

A three-month extension of time (EOT) for responding to the subject Office action is hereby petitioned under 37 C.F.R. §1.17(a)(3). A fee in the amount of $555 is enclosed herein in conjunction with such petition for EOT. It is not believed that any additional fees are required beyond those that may otherwise be provided for in documents accompanying this paper. However, other fees that may be necessary to allow consideration of this paper are hereby authorized to be charged to Deposit Account No. 14-0629.

The Examiner is invited and encouraged to contact directly the undersigned if such contact may enhance the efficient prosecution of this application to issue.

Respectfully submitted,

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